

Offering a brief look at the vital research and development contributions made by the Small Business Innovation Research (SBIR) Program in direct support of the Air Force mission.

Air Force SBIR Update



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Focus on Commercialization

by Stephen Guilfoos

As we continue to strengthen the Air Force SBIR program, one of the key areas receiving critical focus from our Program Management Team is commercialization. Specifically, how can the Air Force commercialize more small business technologies into military markets?

The Law and DoD Guidance

Public law 97-219, creating the SBIR program in 1982, states that one of the purposes of SBIR is "...to increase private sector commercialization innovations derived from federal research and development." Public Law 102-564, approved in October 1992, re-authorized the SBIR Program for an additional eight years. Here again, the importance of commercialization was specifically emphasized. It recognizes that "...the SBIR program has created jobs, expanded business opportunities for small firms, stimulated the development of new products and services, and

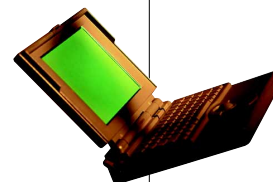
improved the competitiveness of the nation's high technology industries."

Bolstering the growing emphasis on commercialization, Dr. Jacques Gansler, Under Secretary of Defense for Acquisition and Technology, told acquisition program managers to "...include SBIR as part of ongoing program planning, and to give favorable consideration... for funding of successful SBIR technologies." Mr. Lawrence Delany, Assistant Secretary of the Air Force for Acquisition, referring to Dr. Gansler's guidance, said, "I am directing the Acquisition Category 1 and 2 program managers to implement... the plan."

Challenges to Commercializing SBIR Technology

Recently, the Air Force along with the Dayton Area Defense Contractors Association, sponsored a roundtable discussion on commercializing Air Force small business technology. Participants included small businesses, representatives from large aerospace prime contractors as well as various Air Force organizations. The group considered the challenges to future commercialization into military markets. According to small business participants these commercialization challenges included:

- Difficulty in identifying all the Air Force players.



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SBIR Tech Issues

Tech Issues is intended for personnel directly involved in the operation and support of the AF SBIR program.



Program Update

FY 00 Phase I Statistics as of March 31, 2000

- Air Force SBIR Program received 2,443 proposals.
- 1,135 different companies submitted proposals.
- 416 of these companies were first time proposers.
- 346 winning proposals were selected from 19 states.

(Source: BRTRC)

Air Force Fast Track Program Takes Off

The Air Force SBIR Program was recently recognized by the Office of the Secretary of Defense for Acquisition and Technology for steps taken to significantly increase participation in the Fast Track program. Over the past seven months there has been a three-fold increase in Air Force participation in Fast Track over previous years.

A recent independent evaluation by the National Academy of Sciences found that Fast Track SBIR

projects are far outperforming a control group of non-Fast Track SBIR projects in initial commercialization (in military and/or private sector markets) and in contributions to the Air Force's R&D mission.

DoD Fast Track Results September 1997 through February 2000

- 158 Phase I projects qualified for the DoD Fast Track Program.
- 95 percent of these were selected for Phase II. By contrast, on average 40% of all DoD Phase I projects are selected for Phase II awards.
- Nearly all projects selected for Phase II under DoD Fast Track received interim "bridge" funding to cover the gap between Phases I and II.
- Approximately 70 percent of Fast Track companies have never previously received a Phase II SBIR award.
- Adding up all the numbers, \$113 million in DoD SBIR funds has directly leveraged at least \$55 million in matching cash from outside investors.

SBIR Facts and Figures

The FY 99 Air Force SBIR Program budget authority is \$192.520 million. Through March 31, 2000 the Air Force has obligated just over \$175 million of this total as Phase I or II funding to the DoD critical technology areas listed below.

DoD Critical Technology Areas	Phase I / II Funding as of 4/1/00
Aerospace Propulsion and Power	\$0.326
Air Platforms	16.790
Biomedical	0.394
Chemical/Biological Defense	1.560
Conventional Weapons	0.200
Ground and Sea Vehicles	0.395
Human Systems	14.436
Information Systems Technology	36.973
Materials/Processes	24.151
Sensors, Electronics and Battlespace Environment	41.895
Space Platforms	14.784
Weapons	23.105

Dollars in millions (Source: Air Force database at BRTRC)

Upcoming SBIR Conferences

National SBIR Conference
May 5-7, 2000
Crystal Gateway Marriott Hotel
Washington, DC

**For additional information
call (561) 588-8825**

(Source: DoD SBIR Program)

AF SBIR Impact

On-Board Electric Propulsion Technology Developed For Small Satellites

Air Force Requirement

Air Force satellites are getting smaller and tending to operate on lower power while maintaining capabilities of larger, complex multi-mission spacecraft. This move to smaller satellites will reduce overall mission costs, as satellites will require shorter acquisition time while costing less to produce, launch and operate. To operate effectively, small satellites require on-board propulsion with low power, high specific impulse (Isp) and high efficiency.

SBIR Technology

Using SBIR Phase I and II contracts, Busek Company, Inc. developed a low power xenon Hall thruster electro-propulsion system. Electro-propulsion is much more efficient than conventional chemical propulsion. One of the best electronic propulsion devices is the Hall thruster because it operates in an efficient and specific impulse regime that allows the spacecraft manufacturer to increase payload and stay in orbit longer. The propulsion system

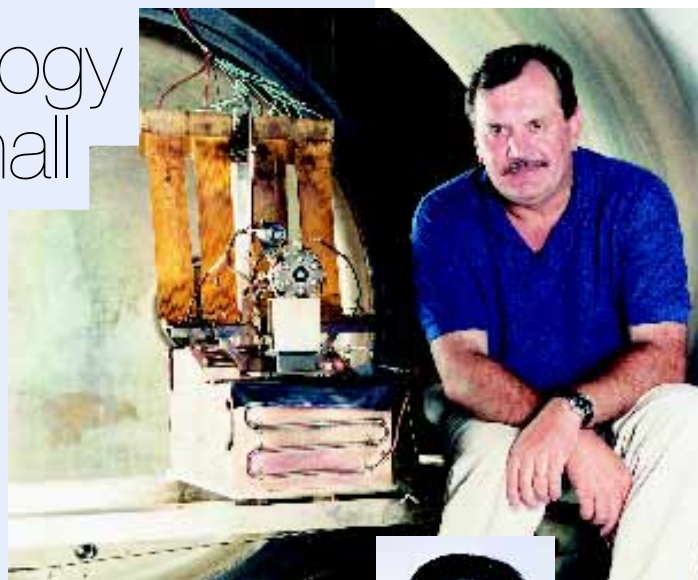
consists of a high efficiency, high Isp, Hall effect ion accelerator, a discharge power processing unit (PPU) and a low power miniaturized cathode. Two styles of thrusters were designed and tested in Busek's space simulation chamber.

Payoff

The Air Force uses the SBIR program to capitalize on the military and commercial potential of next generation advanced on-board propulsion technology. Previously the technology only existed in Russia. The SBIR program provided the Air Force with the opportunity to develop the first entirely U.S. designed Hall thruster and to create a domestic source for this critical technology.

Technology Transfer/Commercialization

Busek Company has executed a licensing agreement with the Primex Aerospace Company in Redmond, Washington for multi-kilowatt Hall thruster technology. The impressive performance and long-life capability of the thruster system resulted in Lockheed Martin Missiles



and Space (LMMS) awarding Primex a commercial contract for flight hardware development, qualification and integration of Hall thruster technology on LMMS next generation satellites. Busek Company expects Hall thrusters to assume a significant percentage of the on-board propulsion for the growing commercial satellite business. Total company sales to date exceed \$3 million. Dr. Vlad Hruby, founder and president of Busek said, "Without SBIR assisting us to maintain a cutting edge in this technology, we could not hope to compete against the larger aerospace companies that are predominate in the space industry."

SBIR Partner

Busek Company, Inc.
Natick, MA

Employees

18

"This SBIR project guarantees that we have a U.S. supplier of Hall thruster technology. Busek Company has done a tremendous job advancing the state-of-the-art of Hall thrusters domestically, so that we can greatly reduce our reliance on Russia. Hall thrusters are going to be a major advancement for many next-generation Air Force satellite systems."

Ron Spores, Ph.D.
SBIR Project Officer
AFRL/PRRS

Air Force SBIR Update

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Focus On Commercialization

- Development time (average 4 years is too long relative to the pace of technology change).
- Need for an SBIR transitions "champion."
- Need for designated funding of Phase III commercialization.
- Need for strengthening communications (internal and external).
- Lack of common understanding ("model") of a successful SBIR transition.

In all, small business participants identified more than 30 challenges. These challenges and all recommended solutions will be considered and addressed where feasible.

Future Opportunities

Will all successfully developed SBIR technologies be inserted into DoD systems and subsystems? Probably not. Although our intent is to use as many technologies as possible, there are some practical realities in today's acquisition process that will frustrate the insertion of SBIR technologies.

The biggest impediment is the shrinking number of viable programs/projects. The Air Force is simply

buying fewer new weapon systems. A second impediment is the limited amount of money available as measured against the total numbers of different requirements. Does this mean all is lost? No, certainly not. In fact, many weapon systems are having their service lives extended well beyond the original design life. Some systems designed in the 1950s and 60s are expected to fly for another 30 to 40 years. This opens up the retrofit and sustainment markets. Other opportunities reside with the upgrading of subsystems. Programs like the Commercial Operations and Support Systems Initiatives that consider commercial technologies that reduce costs, or the Lightning Bolt 99-3 initiative that requires all acquisition offices to search for commercially available technology, will continue to grow in importance.

Creating Early Support

The challenge for the Air Force SBIR program will be to generate topics that have a strong potential for commercialization into military markets. To this end,

we have assigned more than half of our SBIR topics to those executives with acquisition authority – the Designated Acquisition Commanders (DAC) and the Program Executive Officers (PEO). By creating acquisition community ownership early in the SBIR process, we are continuing to build a ready market for the resultant SBIR technologies.

Spotlight on Commercialization

Each AF SBIR Advantage features an Air Force SBIR "Impact Story," one of the Air Force's successes in SBIR commercialization. In this issue, you can read about on-board electric propulsion technology developed for small satellites by Busek Company, Inc. of Natick, MA. We have also published a brochure highlighting a number of these Impact Stories. Soon, we will be releasing a video featuring several companies that have successfully commercialized their SBIR technology. The new *AFRL HORIZONS* quarterly magazine will also highlight an Impact Story in each issue.



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The goal of the Air Force SBIR Program is to serve the technology needs of Air Force warfighters. It accomplishes its mission as part of the Air Force Research Laboratory's (AFRL) integrated research and development (R&D) team. AFRL's mission is to be the Air Force agent for identifying and providing advanced, affordable and integrated technologies that keep our Air Force the best in the world.

SBIR Advantage is published quarterly by the Air Force SBIR Program office. This publication offers an overview of AF SBIR issues and information. The purpose of *SBIR Advantage* is to provide Air Force, DoD, and other government leadership with additional insight into the vital contributions made by the SBIR program to Air Force R&D.

SBIR Advantage is available online at:
www.afrl.af.mil/sbir/index.htm

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